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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|---------------------|-----------------------------|
| 10/635,810 | 08/05/2003 | Jonathan Simon | 10021278-1 | 8835 |
| 7590 | 10/28/2004 | | | EXAMINER DUPUIS, DEREK L |
| AGILENT TECHNOLOGIES, INC. Legal Department, DL429 Intellectual Property Administration P.O. Box 7599 Loveland, CO 80537-0599 | | | ART UNIT 2883 | PAPER NUMBER |

DATE MAILED: 10/28/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | |
|------------------------------|----------------------------|---------------------|
| Office Action Summary | Application No. | Applicant(s) |
| | 10/635,810 | SIMON ET AL. |
| | Examiner Derek L Dupuis | Art Unit 2883 |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) Responsive to communication(s) filed on ____.
 2a) This action is **FINAL**. 2b) This action is non-final.
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) Claim(s) 1-21 is/are pending in the application.
 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
 5) Claim(s) ____ is/are allowed.
 6) Claim(s) 1-3,6-13 and 16-21 is/are rejected.
 7) Claim(s) 4,5,11,14 and 15 is/are objected to.
 8) Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

9) The specification is objected to by the Examiner.
 10) The drawing(s) filed on 8/5/2003 is/are: a) accepted or b) objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. ____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) Notice of References Cited (PTO-892)
 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
 3) Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
 Paper No(s)/Mail Date 9/7/2004.

4) Interview Summary (PTO-413)
 Paper No(s)/Mail Date. ____ .
 5) Notice of Informal Patent Application (PTO-152)
 6) Other: ____

DETAILED ACTION

Drawings

1. The drawings filed on 8/5/2003 are accepted by the examiner.

Specification

2. The disclosure is objected to because of the following informalities: the phrase "by pressing it into the same a suitable depth" in line 9 of paragraph 17 should apparently be "by pressing it into the same suitable depth" or "by pressing it into a suitable depth".

Appropriate correction is required.

Claim Objections

3. Claim 11 is objected to because of the following informalities: the phrase "An parallel optical interconnect" in line 1 of the claim should apparently be "A parallel optical interconnect".

4. Claim 14 is objected to because of the following informalities: the phrase "of Claim 1" should apparently be "of Claim 11".

5. Appropriate correction is required.

Claim Rejections - 35 USC § 112

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claims 9 and 19 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The limitation "the optoelectronic device, penetrator and/or optical fiber" is indefinite because the use of "and/or" does not particularly point out whether the

encapsulating layer covers all three elements or just one of the elements. For the purposes of this office action, the examiner will assume that the encapsulating layer covers all three elements, as this would be the narrowest possible interpretation of the claim as currently written.

Claim Rejections - 35 USC § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

9. Claims 1-3, 6-8, 10-13, 16-18, and 21 are rejected under 35 U.S.C. 102(b) as being anticipated by *Wang et al. (US 6,307,987 B1)*.

10. With regard to claim 1, Wang teaches an optical interconnect for a fiber optic system in figure 6 of the prior art reference. The interconnect (60) includes an optoelectronic device (62) such as an LED or a diode (see column 6, lines 29-67 of Wang). The interconnect also has a penetrator (38) made of an optically transmissive material. Wang specifies that the notch (34) can be filled by an optically transmissive and luminescent filling material (see column 3, line 39 column 4, line 2). The solid filling inside of the notch constitutes the penetrator. The penetrator is optically coupled to the optoelectronic device as seen by the vertical arrows in the figure. The penetrator is configured for insertion along the length of the optical fiber (32) so as to transfer light from the optical fiber to the optoelectronic device.

11. With regard to claims 2 and 3, Wang teaches an optical interconnect for a fiber optic system as discussed above in reference to claim 1. As seen in figures 6 and 13, the penetrator (filled notch) taught by Wang can have a pyramidal or a conical shape.

12. With regard to claims 6 and 7, Wang teaches an optical interconnect for a fiber optic system as discussed above in reference to claim 1. Wang also teaches a filter coating (40 in figure 1) that cause reflections of infrared light to pass through the optical fiber and not reflect into the optoelectronic device. Wang also teaches that the filter coating (40) and luminescent coating (36) help to couple visible light between the optical fiber and the optoelectronic device.

13. With regard to claim 8, Wang teaches an optical interconnect for a fiber optic system as discussed above in reference to claim 1. Wang also teaches that the penetrator pierces an optical fiber to optically couple the optoelectronic device to the optical fiber as shown in figure 6.

14. With regard to claim 10, Wang teaches an optical interconnect for a fiber optic system as discussed above in reference to claim 1. Wang also teaches a plastic optical fiber shown in figure 6 where in the penetrator is inserted along the length of the fiber at least halfway across the diameter as shown in the figure.

15. With regard to claim 11, Wang teaches a parallel optical interconnect for a fiber optic system as shown in figures 23-26 of Wang. Wang teaches a plurality of optoelectronic devices arranged in a linear array. Wang further teaches a plurality of filled notches (penetrators) filled with an optically transmissive material that optically couples an optoelectronic device to its corresponding plastic optical fiber. The penetrators are configured for insertion along the length of the optical fiber as shown in figure 6 of Wang. Wang also teaches that the optical fibers of the array are arranged side by side.

16. With regard to claims 12 and 13, Wang teaches a parallel optical interconnect as discussed above in reference to claim 11. Wang also teaches in figures 6 and 13 that the penetrator (filled notch) can have a pyramidal or a conical shape.

17. With regard to claims 16 and 17, Wang teaches a parallel optical interconnect as discussed above in reference to claim 11. Wang also teaches a filter coating (40 in figure 1) that cause reflections of infrared light to pass through the optical fiber and not reflect into the optoelectronic device. Wang also teaches that the filter coating (40) and luminescent coating (36) help to couple visible light between the optical fiber and the optoelectronic device.With regard to claim 18, Wang teaches a parallel optical interconnect as discussed above in reference to claim 11. Wang also teaches in figures 23 and 26 a plurality of optical fibers that each correspond to a penetrator that pierces the optical fiber to optically couple each optoelectronic device to its corresponding optical fiber.

18. With regard to claim 21, Wang teaches a method of providing an optical interconnect in a fiber optic system. Wang teaches the step of providing an optoelectronic device (62 in figure 6), specifically an LED or a laser diode. Wang also teaches the step of providing a plastic optical fiber as shown in figure 6 of Wang. Wang positions a filled-notch (penetrator) (34) filled with an optically transmissive material (38) adjacent to the optoelectronic device (62 in figure 6) in a manner that allows light to be transferred between the optoelectronic device and the penetrator as shown by the vertical arrows in figure 6. The penetrator made of the optically transmissive filling material is inserted through a sidewall of the optical fiber along the length of the plastic optical fiber. Wang teaches that in this way, light is transferred between the optical fiber and the optoelectronic device via the filled-notch (penetrator).

19. Claims 1, 8-10, and 21 are rejected under 35 U.S.C. 102(b) as being anticipated by *Embrey (GB 2,168,165 A)*.

20. With regard to claim 1, Embrey teaches an optical interconnect for a fiber optic system.

Figure 3 of Embrey teaches an optoelectronic device (8) and a penetrator (9) made of an optically transmissive material. The penetrator is optically coupled to the optoelectronic device. The penetrator is configured for insertion along the length of an optical fiber for transferring light between the optical fiber and the optoelectronic device via the penetrator.

21. With regard to claims 8-10, Embrey teaches an optical interconnect as discussed above in reference to claim 1. Embrey also teaches an optical fiber having the penetrator pierced therein to optically couple the optoelectronic device to the optical fiber as shown in figure 3 of Embrey. Embrey also teaches an encapsulation layer housing (3) that surrounds the optoelectronic device, the penetrator, and the optical fiber. Embrey also teaches a plastic optical fiber and that the penetrator is inserted along the length of the plastic optical fiber (core 1 and cladding 2) at least halfway across the diameter of the fiber as shown in figure 3 of Embrey.

22. With regard to claim 21, Embrey teaches a method of providing an optical interconnect in a fiber optic system. Embrey provides an optoelectronic device (8 in figure 3). Embrey also teaches the step of providing a plastic optical fiber (core 1 and cladding 2). Embrey positions a penetrator (9) made of an optically transmissive material adjacent to the optoelectronic device (3) in a manner that allows light to be transferred between the optoelectronic device and the penetrator. The penetrator made of the optically transmissive filling material is inserted through a sidewall of the optical fiber along the length of the plastic optical fiber. Embrey teaches that in this way, light is transferred between the optical fiber and the optoelectronic device via the penetrator.

Claim Rejections - 35 USC § 103

23. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

24. Claims 9 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Wang et al. (US 6,307,987 B1)* as applied to above claims 8 and 18 respectively, and further in view of *Embrey (GB 2,168,165 A)*.

25. With regard to claims 9 and 19, Wang teaches an optical interconnect and a plural optical interconnect as discussed above in reference to claims 8 and 18 respectively. Wang does not teach an encapsulation layer that at least partially surrounds the optoelectronic devices penetrators, and the optical fibers. Embrey teaches an encapsulation layer (3) in figure 3 that surrounds the optoelectronic device, the penetrator, and the optical fiber. It would have been obvious to one of ordinary skill in the art at the time of invention to use the encapsulating layer taught by Embrey on the optical interconnect taught by Wang. Motivation to do this would be to protect the surrounded elements.

26. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over *Wang et al. (US 6,307,987 B1)* as applied to claim 11 above, and further in view of the applicant's admission of prior art.

27. With regard to claim 20, Wang teaches an optical interconnect as discussed above in reference to claim 11. Wang does not teach that the optoelectronic devices are attached to a support selected from the group consisting of a common ceramic substrate, a common silicon

substrate and a common integrated circuit. Figure 1 of the application, identified by the applicant as prior art, shows ceramic substrate (14) upon which several optoelectronic devices (12) are attached. It would have been obvious to one of ordinary skill in the art at the time of invention to attach the optoelectronic devices of the optical interconnect taught by Wang to a ceramic substrate which is admitted as prior art by the applicant for the purpose of mounting the optoelectronic devices to the silicon support blocks of the interconnect device.

Allowable Subject Matter

28. Claims 4, 5, 14, and 15 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.
29. The following is a statement of reasons for the indication of allowable subject matter:
30. Claims 4 and 14 are allowable over the prior art of record because the latter, either alone or in combination, does not disclose nor render obvious an optical interconnect or a plural optical interconnect with penetrators that are etched into a substrate of an optoelectronic device in combination with the rest of the claimed limitations.
31. Claims 5 and 15 are allowable over the prior art of record because the latter, either alone or in combination, does not disclose nor render obvious an optical interconnect or a plural optical interconnect with a top emitting vertical cavity surface emitting laser (VCSEL) or a bottom emitting VCSEL as optoelectronic devices in combination with the rest of the claimed limitations.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Derek L Dupuis whose telephone number is (571) 272-3101. The examiner can normally be reached on Monday - Friday 8:30am-4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank G. Font can be reached on (571) 272-2415. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Derek L. Dupuis
Examiner
Group Art Unit 2883



Brian Healy
Primary Examiner